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POLLUTION OF WATER SUPPLIES

by

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	Page
POLLUTION'S THREAT TO FUTURE WATER SUPPLY	905
Present Extent of Water Supply Pollution	906
Health Hazards from New Water Contaminants	908
Economic Losses from Watercourse Defilement	908
Varying Pollution Problems in Different Areas	909
POSITIONS OF INCOMING AND OUTGOING PRESIDENTS	910
Democratic Position on Pollution Control	911
Eisenhower Opposition to Enlarged Grants in Aid	912
Controversial Issues for Settlement by Congress	912
PROGRESS AND PROBLEMS IN POLLUTION CONTROL	914
Need of New Methods of Water Protection	914
Pollution Control Systems in Foreign Countries	914
Enforcement of Controls in the United States	916
Increased Abatement Activity by Private Industry	917

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POLLUTION OF WATER SUPPLIES

"CLEAN WATER—A Challenge to the Nation" is the theme of a national conference meeting in Washington, Dec. 12-14, to formulate means of dealing with the growing threat of water pollution to public health and to the economic and social welfare of the American people. The conference was called by U.S. Surgeon General Leroy E. Burney, but it was originally suggested by President Eisenhower in a message to Congress last Feb. 23 vetoing a Democratic water pollution bill. The objectives of the conference, according to Arthur S. Flemming, Secretary of Health, Education and Welfare, are "(1) to reach agreement on a set of national goals to curb pollution; (2) to set forth specific programs needed to achieve these goals."

The President acknowledged in his February veto message that polluted water is a menace to the health and well-being of all Americans. "Yet, pollution and its correction are so closely involved with local industrial processes and with public water supply and sewage treatment," he added, "that the problem can be successfully met only if state and local governments and industry assume the major responsibility for cleaning up the nation's rivers and streams."

Sen. John F. Kennedy (D Mass.), now President-elect, criticized the veto message, saying that the bill's proposed increase in federal grants to municipalities for pollution abatement represented the minimum of federal aid needed for effective control. The question of federal vs. state and local shares in the responsibility for cleaning up the watercourses promises to be a leading point of controversy among the 1,500 public leaders and authorities on water management and environmental health who will attend the Washington water pollution conference.

A principal reason for the growing concern over water pollution is recognition of the threat it holds to the nation's resources of usable water. The U.S. Public Health Service

has estimated that by 1980 total withdrawals of water for all purposes may equal the 650 billion gallons a day of "developable water supply." And by the end of the century total demand, calculated on the basis of the current rate of increase in consumption, may be twice the available supply.[1]

The anticipated increase in demand is not now considered alarming because water can be used several times as it flows to the sea. But for re-use the water must be of suitable quality and the Public Health Service reports that "We are rapidly running out of clean water."

The price paid for the sweeping advances of modern technology has been an upset in the balance of man's physical environment and an increase in pollution not only of water but also of the air and the soil. Impurities can be as effective as prolonged drought in reducing or destroying a water resource. Saving of water by prevention and control of pollution is one way of ensuring an adequate supply of usable water for future years.

Present Extent of Water Supply Pollution

Statistics compiled by the U.S. Public Health Service disclose that the volume of impurities poured into the country's rivers and streams has increased at an accelerating rate in recent years and that industry now discharges twice as much waste in the watercourses as is discharged by all of the nation's cities and towns. Dr. Mark D. Hollis, Assistant Surgeon General, has said that "on a national basis, for no year since 1910 have we removed, through treatment, as much pollution as was added." [2]

In 1900, the total of treated and untreated wastes discharged daily by municipalities was equivalent to the sewage discharge of 24 million persons, and wastes discharged daily by industry were equivalent to the sewage discharge of 15 million persons. Since urban populations were small at the turn of the century, and distances between sewer outfalls and water intakes were long, maximum use was made of the assimilation capacity of the streams and the health problem was relatively minor.

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[1] Senate Select Committee on National Water Resources (Committee Print No. 24), Feb. 26, 1960, p. 1.

[2] Speech before 18th annual conference of American Water Works Association, May 17, 1960.

POLLUTION DISCHARGED INTO U.S. WATERCOURSES
(Index Numbers)

	1900	1920	1940	1960
Municipal wastes	24	40	54	75
Industrial wastes	15	49	75	150

SOURCE: Revised Public Health Service *Fact Sheet on National Conference on Water Pollution*, p. 8.

By 1920 the population served by sewers had risen to 47 million and the population using surface streams for drinking water had climbed to 20 million. Now 100 million people depend on surface streams for drinking water, almost as many as the 105 million now served by sewers. As a result, sewage outlets and water intakes have been squeezed much closer together and both sewage treatment and water purification have become much more important.

A large backlog of needed sewage and industrial waste-treatment construction has accumulated through the years. According to the Public Health Service, nearly 2,900 new sewage treatment works are needed to serve 19.5 million persons living in communities that have never provided treatment for their wastes. And 1,100 new plants are needed for 3.4 million persons in communities where treatment works built in the past have become overloaded or obsolete.

In addition to the 4,000 towns and cities needing new plants, 1,630 communities have sewage-treatment facilities requiring enlargment or the addition of new units or processes to adequately serve populations totaling more than 25 million. This backlog is not the whole problem, because population growth and urbanization are constantly expanding sewage-treatment requirements.

The Public Health Service estimated in 1958 that if municipalities were to catch up with treatment needs by 1965, they would have to spend $1.9 billion to eliminate the backlog, $1.8 billion to provide for population growth, and $900 million to replace plants that would become obsolete. This was a total of $4.6 billion, and would have required expenditure of an average of $575 million a year over the period 1958-65. However, since that level was not reached in 1958 or 1959, the Public Health Service now estimates that outlays of nearly $600 million a year are

necessary to catch up with the backlog and meet the prospective needs of 1965.

Health Hazards From New Water Contaminants

While water purification long ago largely checked the ravages of typhoid fever and other water-borne bacterial diseases, health officials are now worried about the increasing amounts of new contaminants, such as common acids, other chemicals and radioactive materials, dumped into streams by industrial establishments. Unlike bacteria, the new pollutants often are not removed either by sewage treatment or by water purification. Many of them were not known a few years ago; an estimated 7,000 new chemicals, including a wide variety of household cleaning and laundering compounds, are put on the market annually.

Surgeon General Burney has said that some of the new pollutants, many of them known to be highly toxic, are probably passing through water purification systems in low concentrations. Methods of removing them have yet to be developed. Burney concedes that there is no proof so far that these chemicals are causing deaths or illnesses. "But," he asks, "how does the human body react to steady doses of diluted chemicals? What happens if the concentration increases, either suddenly or gradually? We cannot say that we know the answers." [3]

Assistant Surgeon General Hollis has said that the health effects from the new pollutants will probably be subtle, much less easy to detect than the effects of water-borne bacteria, and much more difficult to pinpoint. "Somewhere ahead on this fantastic growth curve we are going to be in trouble. The question is how much time do we have to get set." [4]

Economic Losses From Watercourse Defilement

The economic loss caused by water pollution currently amounts to at least $1 billion a year, according to Gordon McCallum, chief of the water supply and pollution control division of the Public Health Service. This figure includes the costs of treating polluted water and the losses suffered through reductions in real estate values caused by befouled waters, but not the costs of illnesses resulting from water contamination.

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[3] Article in *General Federation Clubwoman*, October 1959.
[4] Speech at American Water Works Association conference, May 17, 1960.

Pollution is a serious threat to aquatic life and a discouragement to recreational activities at fresh water beaches and on rivers and streams. The demand for clean water for swimming, boating, water skiing, and sport fishing has grown tremendously in recent years. Water recreation and sport fishing are now a large source of income in a number of states.

Safe water for recreation is being reduced at the very time that the public appetite for water sports is showing a healthy growth. According to the Public Health Service, only 35 miles of New York City's 575 miles of waterfront are fit for swimming. Pollution is said by P.H.S. to be killing more fish each year than the U.S. Fish and Wildlife Service stocks.

Some forms of pollution have a direct effect upon navigation because they corrode steel hulls, concrete structures, and lock gates. Unclean waters can cause damage also to industrial equipment. While water used by industry need not be of drinking standard quality, it must be free of corrosive chemicals and of impurities which leave scale or other heavy deposits in cooling apparatus.

Varying Pollution Problems in Different Areas

Water pollution is a national problem, but it varies in type and degree from region to region. On the shores of the Great Lakes, pollution of bathing beaches is a troublesome problem. Several beaches have to be closed every year because of bacterial pollution. In the late summer of 1959 bathers were excluded from one or more beaches at almost every major Great Lakes city except Chicago. The many pollution problems in the Great Lakes region involve discharges not only from municipal sewer systems but also from numerous industries. Raw sewage and garbage from lake-going ships contribute to contamination of the waters.

In Colorado, an aggressive state water pollution control program, assisted materially by federal construction grants, is reducing pollution caused by cities in the state. However, the largest city, Denver, has challenged in the courts the authority of the state government to require that it provide a higher degree of waste treatment.

In the Southwest, the Red River and some of its tributaries contain excessive amounts of mineral pollutants re-

ceived from both industry and natural sources. As a result, the Red River is unsuitable for use as a municipal or industrial water supply. About 50 per cent of the mineral pollution is made up of oil brines contributed by industry. The Arkansas River and some of its tributaries also contain large amounts of mineral pollution, although only 20 per cent of it is contributed by industrial establishments.[5]

In the Camden area of southwestern New Jersey, the heavily polluted waters of the Delaware River have been infiltrating the major ground reservoirs drawn upon for water supply. This has progressively lowered the quality of the available ground water, creating a need for additional treatment and for development of new wells to tap more wholesome supplies.

Positions of Incoming and Outgoing Presidents

AFTER President-elect John F. Kennedy takes office, the federal government can be expected to play a more active role in encouraging and stimulating action by local governments to stem the rising tide of pollution.

A federal pollution control act passed by Congress in 1956, and scheduled to expire in 1966, authorizes annual appropriations of $50 million to assist communities with construction of sewage-treatment plants. The federal contribution is limited to 30 per cent of the total cost or $250,000, whichever is smaller. This program would have been superseded by the bill vetoed by President Eisenhower in February. The new ten-year program proposed in that bill would have increased from $50 million to $90 million a year the total of construction grants authorized in the 1956 legislation.

The President's veto was sustained by the House, Feb. 25, 249 to 157, with the votes to override 22 short of the required two-thirds majority. Voting to enact the bill notwithstanding the President's objections were 234 Democrats and 15 Republicans; voting to uphold the veto were 27 Democrats and 130 Republicans. This was virtually a

[5] Congress has authorized a $400,000 expenditure by the Public Health Service to continue a five-year study of the mineral pollution problem in the Arkansas and Red rivers. Completion of the study is expected in 1962.

party-line vote, and the veto subsequently became an issue of some importance in the 1960 presidential campaign.

DEMOCRATIC POSITION ON POLLUTION CONTROL

The plank on water pollution of the 1960 Democratic platform said federal action was needed in planning, coordinating, and helping to finance pollution control. It added: "The states and local communities cannot go it alone. Yet President Eisenhower vetoed a Democratic bill to give them more financial help in building sewage treatment plants. A Democratic President will sign such a bill." Another section warned that "America can no longer take pure water and air for granted."

Sen. Kennedy said last Feb. 24 that he had been "shocked" by the President's veto but his own statements on water pollution during the campaign were considerably more moderate than those of many of his supporters. While maintaining that generous federal grants were needed, he conceded that pollution control was essentially a local problem. A typical statement, many times repeated in campaign speeches, was the following: "It is the cities and towns who must, in the last analysis, make the plans and build the plants, but it is only through the coordinated efforts of all our governments—federal, state and local—that we can maintain the abundant water resources necessary for a great and growing nation." [6] Similarly the man chosen by Kennedy to head the Department of Health, Education and Welfare, Gov. Abraham R. Ribicoff of Connecticut, said on Dec. 1: "There is a great deal of cooperation necessary between the states and the federal government . . . because many of these [H.E.W.] programs involve grants." If a new Department of Urban Affairs is set up under the Kennedy administration, supervision of the pollution-control program may be transferred to that department.

A "position paper" prepared for Kennedy's use in the 1960 campaign called for liberalization of the 1956 pollution control act (1) by raising the ceiling on annual federal grants to local governments for sewage-treatment facilities from $50 million to "a level ranging from $80 million to $100 million" and (2) removing the limitation

[6] In a Senate speech, May 18, 1953, Kennedy singled out pollution as "the largest single destroyer of New England water resources, hindering the economy, health and prosperity of the region."

of $250,000 on the amount that may be granted for any one project. "In many large metropolitan centers effective action on pollution control can only be taken by groups of cities and towns working together in the construction of central plants." In addition, the paper recommended establishment of a central clearing house of information through which the latest discoveries and advances in pollution control could be made "instantly available to engineers all over the country—preventing the waste of duplication and spreading the benefits of past accomplishments."

Eisenhower Opposition to Enlarged Grants in Aid

President Eisenhower, while approving grants to the states for development of water pollution control programs, has consistently opposed grants to municipalities to assist in construction of sewage-treatment plants. In his 1958 and 1959 budget messages he recommended that the grants to municipalities authorized by the 1956 pollution control act be abolished.

In his message vetoing the 1960 pollution bill, the President said the problem could be successfully met "only if states and local government and industry assume the responsibility of cleaning up the nation's rivers and streams." An expanded program of federal grants would provide "excuses for inaction" on the part of industry and local governments.

He approved "modest financial assistance" for the administration of control programs by states and interstate agencies, and more funds for research and technical assistance to give better understanding of the causes, extent, impact and methods of pollution control, but could not approve any expansion of direct federal aid to localities.

Controversial Issues for Settlement by Congress

The federal grant program enacted by Congress in 1956 has been both warmly praised and sharply criticized. President-elect Kennedy has described the response to the program by local governments as "electric." Rep. John A. Blatnik (D Minn.), author of the bill vetoed by the President last February, has called the 1956 program "a tremendous success." Two Public Health Service officials[7]

[7] Gordon E. McCallum, chief of the division of water supply and pollution control, and David H. Howells, acting chief, construction grants branch, in a paper presented at convention of American Society of Civil Engineers, Boston, Oct. 10, 1960.

said in a joint evaluation of the program that it had been "an impelling force in the construction of pollution abatement projects."

On the other hand, spokesmen for the U.S. Chamber of Commerce and the National Association of Manufacturers have opposed continuation of the grant program and questioned whether availability of the grants has stimulated construction of sewage-treatment facilities in any material degree.

Leonard E. Pasek, representing the N.A.M., told a House subcommittee last year that in the period from July 1, 1956, to the end of December 1958, contract awards for proposed sewage-treatment construction totaled $928 million. During this period, he continued, $517 million worth of proposed construction by municipalities was approved for federal grants. "Thus," he said, "a great amount of activity was being carried on outside of the federal grant program. The program certainly did not stimulate this portion of the local activity."

Furthermore, in Pasek's opinion, the program is unfair because it asks those who have paid local taxes for construction of treatment plants also to pay federal taxes for construction of treatment plants in other cities. "In addition to its basic unfairness, this type of program does not build up community initiative and responsibility, but undermines it."

Clarence R. Miles of the U.S. Chamber of Commerce testified at the same hearings[8] that the federal grants program might actually be deterring construction of sewage-treatment facilities. He said that statistics cited by the Public Health Service to show that federal aid had greatly increased construction were misleading. The P.H.S. had taken no account of favorable economic factors which Miles said had produced even larger increases in volume in many other lines of construction.

Latest Public Health Service figures show that from June 1956 through September 1960, federal construction grants had been approved for 2,931 sewage-treatment plants. Of these, 1,149 had been completed and 713 were under construction. Total project costs were $1.5 billion, of which federal grants provided $251 million. According to Gordon

[8] Before House Subcommittee on Rivers and Harbors, March 18, 1959.

E. McCallum, chief of the division of water supply and pollution control, "The stimulating effect of the federal grants is seen in the better than 64 per cent rise in sewage-treatment plant construction since the grant funds were made available." [9]

Progress and Problems in Pollution Control

PROGRESS in control of water pollution does not depend upon new money for treatment plants alone; a major obstacle to achieving the objective of clean water for all is the fact that conventional methods of waste treatment are known to be inadequate. Assistant Surgeon General Hollis has said that present treatment technology "simply is not abreast of the times." While present technology can, at a price, moderate traditional organic pollution, "certainly it is not geared to the expected build-up in wastes from new substances." [10]

Unless new and more effective methods of treatment are discovered, the volume, strength and complexity of future municipal and industrial wastes may result in the discharge of larger and larger amounts of impurities into rivers and streams. According to Hollis, "there has been no basic scientific breakthrough" in treatment technology in 40 years and "completely new methods of waste treatment" are called for.

Even the most modern treatment facilities have failed, for example, to solve the problem of adequately handling Chicago's wastes. The city now pours into the Illinois Waterway waste waters which, after treatment, have pollution effects equivalent to the discharge of sewage from a community of about one million persons and contain solids which total about 1,800 tons a day.

Pollution Control Systems in Foreign Countries

Great Britain and Germany have both adopted systems of regional authorities to set pollution control standards for entire river basins. In European countries there seems

[9] Speech at Oklahoma State University, Nov. 16, 1960.
[10] Speech before Federation of Sewage and Industrial Wastes Associations, Oct. 12, 1959, Dallas, Tex.

to be general agreement that the quality of surface waters should be maintained at a proper balance of interest between all users of water resources.[11] In Germany the waters of certain rivers are used only for industrial purposes while other rivers provide the drinking water. And in Britain, pollution standards vary from river to river, depending on expected use.

Until 1948, local councils established the standards and administered most of the British pollution control laws. However, the greater effectiveness of the few regional authorities then in existence led to adoption of the present River Boards Act. More than 30 river boards are now in operation. They have power to regulate the discharge of wastes and can seek court action to enforce their regulations. Standards recommended by the Royal Commission on Sewage Disposal have been adopted by most of the river boards.

River associations in West Germany are responsible to the national government for maintaining rivers in satisfactory condition. In addition to their regulatory powers, the associations have authority to build and operate river improvements, including sewage-treatment plants. German cities are responsible for constructing and maintaining the sewerage systems served by the treatment plants.

The river associations get their revenues from charges assessed against sewer and water authorities, cities and private industry. Comprehensive studies and research activities are carried on by the associations.

In Soviet Russia, scientists, biologists, and hygiene experts are beginning to call for drastic action to halt dumping of waste products by factories and for long-term planning to cover all branches of industry.

In a recent series of articles published by the Moscow newspaper *Literatura i Zhish* the existing system of control was criticized as grossly inadequate. "Our rivers and lakes are becoming dirtier and dirtier. Fish and vegetation are perishing. The health of the people is in real danger. And all this is taking place because sanitary laws are being violated by too many administrators." The root of the trouble, said the writer, was to be found in the

[11] Select Senate Committee on National Water Resources (Committee Print No. 30), March 7, 1960.

"so-called norms" which fix the "maximum allowable poisonous concentration" of wastes dumped into the waters; the norms should be gradually reduced until all dumping of poisonous materials in lakes and rivers was prohibited. *Komsomolskaya Pravda*, organ of the Young Communist League, has called for construction of more treatment stations, increased vigilance by sanitary inspectors, and greater public interest in the problem of water pollution.

Enforcement of Controls in United States

In the United States, there are no national standards or regulations to control discharge of wastes into surface waters. However, water quality standards have been given thorough study by national technical organizations and agencies of the federal government. Standards of required treatment of polluted waters have been established in a few compacts between states. Elsewhere control of surface water pollution is normally a function of the separate states and their localities.

In addition to providing grants-in-aid for construction of sewage-treatment plants, the federal government has begun to press for correction of some of the worst cases of pollution of interstate waters. Secretary of Health, Education and Welfare Flemming said, Nov. 17, that he hoped the Congress meeting in January would simplify and strengthen enforcement provisions of the 1956 Water Pollution Control Act.

Under present provisions the Surgeon General, "when he has reason to believe" that pollution is occurring, calls a conference of officials of the state where it originates and of the state where it has adverse effects. Remedial action is recommended and, if not started within six months, a public hearing is held by the Health-Education-Welfare Secretary who makes further recommendations. If no positive action has been taken by the offender within an additional period of at least six months, the Secretary, upon request of the state in which the pollution originates or the state adversely affected, calls upon the Attorney General for legal action against the community or industry responsible for the pollution.[12] Some form of enforcement action has been taken in 12 cases to date and about 150 areas of potential pollution are now under study by the Public Health Service.

[12] For further details see *Congressional Quarterly Almanac 1956*, pp. 570-573.

The first resort to court action was taken last Sept. 29, when Attorney General William P. Rogers filed suit to compel the City of St. Joseph in Missouri to construct adequate sewage-treatment facilities by 1968. The citizens of St. Joseph had twice refused to approve a $9.5 million bond issue to finance projects recommended by the Public Health Service. The government charges that a dangerous condition has been created by discharge of waste materials into the Missouri River by the city and 18 of its industrial establishments. A case of major importance, involving contamination of the Animas River, from which two towns in New Mexico draw their drinking water supply, was settled without legal action when the Vanadium Corp. agreed to install treatment and other facilities recommended by the Public Health Service at its uranium plant in southern Colorado.

INCREASED ABATEMENT ACTIVITY BY PRIVATE INDUSTRY

While some corporations have resisted Public Health Service recommendations, others have laid out large sums to prevent contamination of watercourses by waste materials from their plants. Industry has a vital interest in pollution abatement because it needs abundant supplies of usable water for steam-making, cooling and processing. It now uses more water than is used by cities for domestic water supply or by agriculture for irrigation, and is expected by 1975 to be using almost two-thirds of the water available.[13]

A representative of the National Association of Manufacturers told a House subcommittee framing new water pollution control legislation last year:

> We are greatly interested in the encouragement of efforts to curb water pollution and to ensure adequate water supplies for the future. There are no two sides to the water pollution problem. We are all on the same side of this battle. Our only difference of opinion is as to the choice of some of the weapons.

An anti-pollution project which will be of no direct benefit to the company involved but will greatly improve the waters of the upper Chesapeake Bay for recreational purposes was given the green light, Sept. 22, by the Maryland Water Pollution Commission. It announced approval of plans by the Bethlehem Steel Co. for construction at its

[13] Senate Select Committee on National Water Resources (Committee Print No. 30), March 7, 1960.

Sparrows Point plant of treatment facilities and discharge lines "similar in scope to a complete sewer system for a small city." The project will cost the company $2 million and will require 18 months for completion.

The American Cyanamid Co., which manufactures some 800 chemical products at its Bound Brook plant in New Jersey, has installed facilities capable of treating 17 million gallons of waste water a day. The West Virginia Pulp & Paper Co. has joined in a cooperative project to construct a 21-million-gallon-a-day plant to handle its paper-mill waste at Luke, Md., and the sewage from three nearby towns. Similar industrial-municipal pollution abatement projects are in various stages of negotiation in other parts of the country.